National Institute of Environmental Health Sciences

Neighborhood effects on heat deaths: Social and environmental predictors of vulnerability in Maricopa County, Arizona

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Abstract:

BACKGROUND: Most heat-related deaths occur in cities, and future trends in global climate change and urbanization may amplify this trend. Understanding how neighborhoods affect heat mortality fills an important gap between studies of individual susceptibility to heat and broadly comparative studies of temperature-mortality relationships in cities. OBJECTIVES: We estimated neighborhood effects of population characteristics and built and natural environments on deaths due to heat exposure in Maricopa County, Arizona (2000-2008). METHODS: We used 2000 U.S. Census data and remotely sensed vegetation and land surface temperature to construct indicators of neighborhood vulnerability and a geographic information system to map vulnerability and residential addresses of persons who died from heat exposure in 2,081 census block groups. Binary logistic regression and spatial analysis were used to associate deaths with neighborhoods. RESULTS: Neighborhood scores on three factors-socioeconomic vulnerability, elderly/isolation, and unvegetated area-varied widely throughout the study area. The preferred model (based on fit and parsimony) for predicting the odds of one or more deaths from heat exposure within a census block group included the first two factors and surface temperature in residential neighborhoods, holding population size constant. Spatial analysis identified clusters of neighborhoods with the highest heat vulnerability scores. A large proportion of deaths occurred among people, including homeless persons, who lived in the inner cores of the largest cities and along an industrial corridor. CONCLUSIONS: Place-based indicators of vulnerability complement analyses of person-level heat risk factors. Surface temperature might be used in Maricopa County to identify the most heat-vulnerable neighborhoods, but more attention to the socioecological complexities of climate adaptation is needed.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3569676

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location:

resource focuses on specific location

United States

Health Impact:

specification of health effect or disease related to climate change exposure

Injury

Intervention:

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern:

populations at particular risk or vulnerability to climate change impacts

Elderly, Low Socioeconomic Status, Racial/Ethnic Subgroup

Other Racial/Ethnic Subgroup: Ethnic minority;Latino immigrant

Other Vulnerable Population: People who live in the inner cores of large cities

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content